

Work Order ID 54009

November 25, 2009 3:06:17 PM



Page 1

Item ID: D206-667-101TRN

Accept



Setup Start



Revision ID: C

Stop



Item Name: Crosstube Turning Detail

Start Date: 25/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 02/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: PLDate: 09-11-25

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Draw Number | Draw Rev. | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|

| Draw Nbr | Revision Nbr |
|--------------|--------------|
| D206-667-141 | Rev C |

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA083□2-Turn first side as per Folio FA083□3-File down transition lines smooth.

Q.M. 09 - 12 - 02 ①

110

0.00



QC1- Inspect dimensions to dimension sheet

QC

Memo

0.00

Quality Control

Q.M. 09 - 12 - 02 ①

120

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA083□2-File down transition lines smooth.
□
3-Remove sand and plugs

Q.M. 09 - 12 - 02 ①

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
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| | | | | | | | | |

NOTE: Date & initial all entries

Work Order ID 54009

November 25, 2009 3:06:17 PM



Page 2

Item ID: D206-667-101TRN

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Stop



Item Name: Crosstube Turning Detail

Start Date: 25/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 02/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Draw Number | Draw Rev. | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|

130

QC1 - Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

Q.R 09-12-02

140

QC8 - Inspect parts - second check

0.00



QC

Memo

0.00

Quality Control

1 - AWM9-12-03

150

Crosstubes Chemical Convesion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1 - AWM9-12-03

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

Work Order ID 54009

November 25, 2009 3:06:17 PM



Page 3

Item ID: D206-667-101TRN

Accept



Setup Start



Revision ID: C

Stop



Item Name: Crosstube Turning Detail

Start Date: 25/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 02/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Draw Number | Draw Rev. | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control



MB 02-12-03

170

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack ☐ Location: K-TUBE CELL

1 - - 11/18/12.03

180

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

09/12/07

4.09.12.03

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

Picklist Print

November 25, 2009 3:06:23 PM

Page 1

Work Order ID: 54009



Parent Item: D206-667-101TRNRevC



Parent Item Name: Crosstube Turning Detail


Start Date: 25/11/2009

Required Date: 02/12/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Remaining Qty To Pick | Qty Issued | Date Issued | Status |
|---|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|--------------------------|---------------|----------------|--------|
| D6001-105RevA | | Manufactured | No | | | 110 | Each | 28.0000 | 1.0000 | | | |
|  | | | | | | | | | | | | |
| Crosstube, Material | | | | | | | | | | | | |

Q.A 09-12-02

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

LG

28

25661

3

29115

25

_____1_____

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

| | | |
|--|---------------------|--------------|
| DART AEROSPACE LTD | Work Order: | 54009 |
| Description: Crosstube Assembly (206B High Fwd) | Part Number: | D206-667-141 |
| Inspection Dwg: D206-667-141 Rev: B | | Page 1 of 1 |

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

| Inspection Sheet | Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|------------------|-------------------|---------------|------------------|--------|--------|----------------------|----------|
| SIDE A | 2.240 | +0.005/-0.000 | 2.242 | / | | | |
| | 2.074 | +0.005/-0.000 | 2.079 | / | | | |
| | 2.074 | +0.005/-0.000 | 2.079 | / | | | |
| | 2.114 | +0.005/-0.000 | 2.117 | / | | | |
| | 2.154 | +0.005/-0.000 | 2.157 | / | | | |
| | 2.194 | +0.005/-0.000 | 2.199 | / | | | |
| | 2.234 | +0.005/-0.000 | 2.239 | / | | | |
| | | | | | | | |
| | 0.110 | +/-0.010 | 0.110 | / | | | |
| | 0.300 x 30° | +/-0.010 | 0.300x30° | / | | | |
| | R0.063 | +/-0.010 | R0.063 | / | | | |
| | R0.500 | +/-0.010 | R0.500 | / | | | |
| SIDE B | 4.438 | +/-0.030 | 4.438 | / | | | |
| | 2.240 | +0.005/-0.000 | 2.243 | / | | | |
| | 2.074 | +0.005/-0.000 | 2.079 | / | | | |
| | 2.074 | +0.005/-0.000 | 2.079 | / | | | |
| | 2.114 | +0.005/-0.000 | 2.117 | / | | | |
| | 2.154 | +0.005/-0.000 | 2.157 | / | | | |
| | 2.194 | +0.005/-0.000 | 2.199 | / | | | |
| | 2.234 | +0.005/-0.000 | 2.239 | / | | | |
| | | | | | | | |
| | 0.110 | +/-0.010 | 0.110 | / | | | |
| | 0.300 x 30° | +/-0.010 | 0.300x30° | / | | | |
| | R0.063 | +/-0.010 | R0.063 | / | | | |
| | R0.500 | +/-0.010 | R0.500 | / | | | |
| | 4.438 | +/-0.030 | 4.438 | / | | | |
| | | | | | | | |
| | 93.18 | +/-0.020 | 93.180 | / | | | |

| | | | | | |
|---------------------|----------|--------------------|---------|----------------------------|-----|
| Measured by: | A.N | Audited by: | ACM | Prototype Approval: | N/A |
| Date: | 09.12.02 | Date: | 5.12.03 | Date: | N/A |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|------------------------------|------------|----------|
| A | 06.10.24 | New Issue (P/O D206-667-101) | KJ/JLM | B |

| Item | Qty -141 | Part Number | Description |
|------|-------------|----------------|--|
| 1 | X | D206-667-141 | CROSSTUBE ASSEMBLY (206B HIGH FWD) |
| 2 | 1 | D6001-105 | CROSSTUBE |
| 3 | 2 | D2873-043 | NUT PLATE |
| 4 | 2 | D2873-045 | NUT PLATE |
| 5 | 2 | D2891-1 | SUPPORT |
| 6 | 4 | D3595-063-395 | RUBBER CUSHION |
| 7 | 4 | MS21920-20 | CLAMP (OR MS21920-21) |
| 8 | 14 | MS20601AD4W8 | RIVET (OR NAS9302B-4-8) |
| 9 | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6001-105
FINISHED LENGTH = 93.18±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 11.3 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 54009
BS 09-11-25

RELEASED
08/11/12

| | | | |
|------------|--|---|--------------|
| C | REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C4-3, C5-3 & D3-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4. | RF | 08.11.06 |
| B | ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES | PH | 05.07.26 |
| A | NEW ISSUE | CP | 00.11.17 |
| REV. | DESCRIPTION | BY | DATE |
| DESIGN | <u>RF</u> | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | <u>RF</u> | DRAWING NO. | REV. C |
| CHECKED | <u>RF</u> | D206-667-141 | SHEET 1 OF 4 |
| MFG. APPR. | <u>RF</u> | TITLE | SCALE |
| APPROVED | <u>RF</u> | CROSSTUBE ASSY (206B HIGH FWD) | NTS |
| DE APPR. | <u>RF</u> | COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRELIMINARY AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD | |
| DATE | 08.11.06 | | |

8

7

6

5

4

3

2

1

12 D2891-1 SUPPORT
2 PL

15 MS21920-20 CLAMP
4 PL

13 D3595-063-395
RUBBER CUSHION
4 PL, (UNDER CLAMP)

B

B

A4-2

C

D206-667-141
ASSEMBLY DETAIL
(VIEW LOOKING FWD)

13 15
MS21920-20 CLAMP REF

12
D2891-1 SUPPORT REF

C D3595-063-395
RUBBER CUSHION REF

FWD

9°

D5-2 **SECTION B-B**
SCALE 5X

D206-667-501

B7-2

D2873-043
NUT PLATE

MS20601AD4W8
RIVET, 4 PL

D2873-045
NUT PLATE

MS20601AD4W8
RIVET, 3 PL

90° REF

C6-2 **VIEW A-A: CUFF DETAIL**
SCALE 4X

RELEASED
08/11/2006

D2873-043
NUT PLATE

D2873-045
NUT PLATE

MS20601AD4W8
RIVET, 4 PL

MS20601AD4W8
RIVET, 3 PL

90° REF

C3-2 **VIEW C-C: CUFF DETAIL**
SCALE 4X

DESIGN
DRAWN
CHECKED
MFG. APPR.
APPROVED
DE APPR.
DATE

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. C
D206-667-141 SHEET 2 OF 4
TITLE SCALE
CROSSTUBE ASS'Y (206B HIGH FWD) NTS

08.11.06

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8

7

6

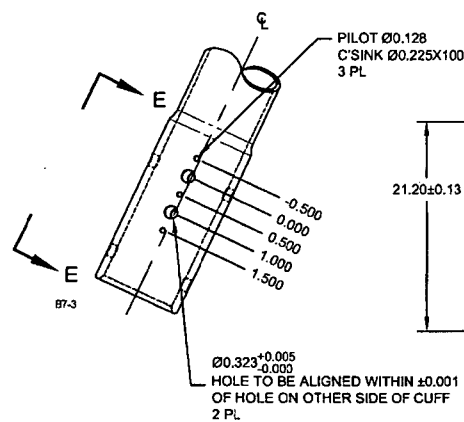
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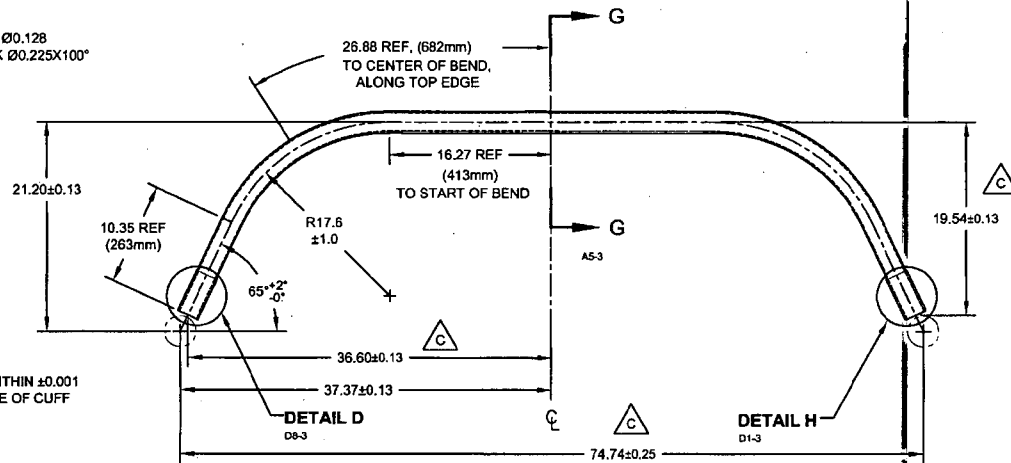
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2

1

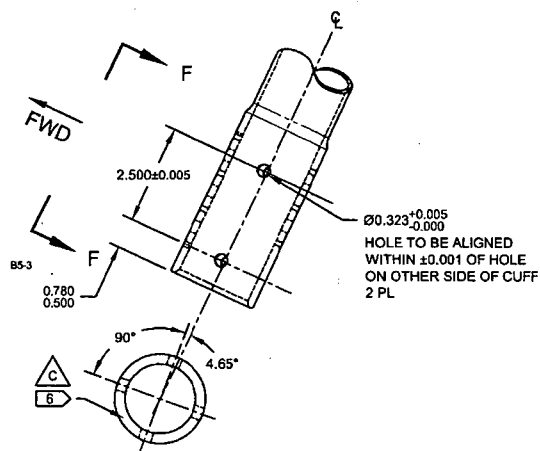


C6-3 **DETAIL D**
SCALE 4X
(VIEW LOOKING FWD)

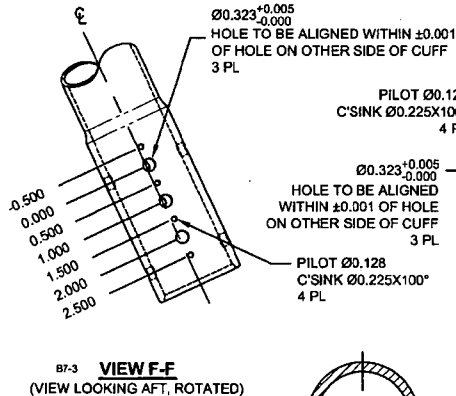


C3-3 **DETAIL H**
SCALE 4X
(VIEW LOOKING FWD)

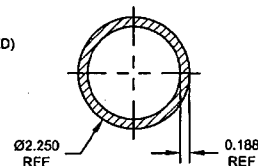
RELEASED
C6/p/h/z/j/f



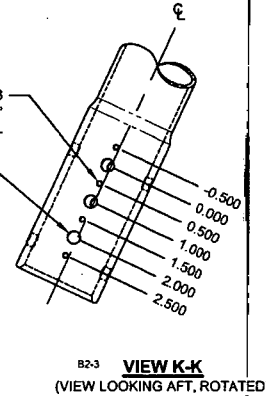
D8-3 **VIEW E-E:**
CUFF DETAIL
SCALE 4X



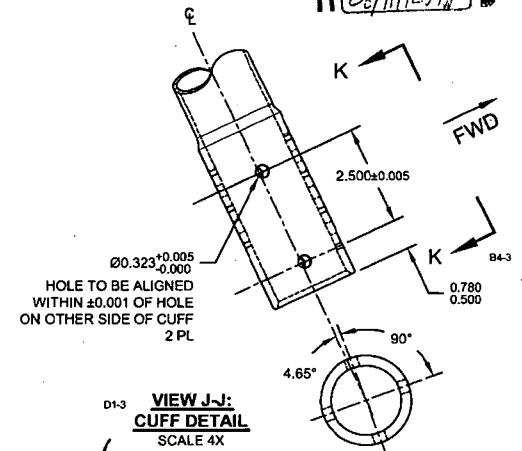
B7-3 **VIEW F-F**
(VIEW LOOKING AFT, ROTATED)



D4-3 **SECTION G-G**
SCALE 5X



B2-3 **VIEW K-K**
(VIEW LOOKING AFT, ROTATED)



D1-3 **VIEW J-J:**
CUFF DETAIL
SCALE 4X

| | | | |
|------------|-----------|---|--------------|
| DESIGN | W10 54009 | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | RF | DRAWING NO. | REV. C |
| CHECKED | RF | D206-667-141 | SHEET 3 OF 4 |
| MFG. APPR. | RF | TITLE | SCALE |
| APPROVED | RF | CROSSTUBE ASS'Y (206B HIGH FWD) | NTS |
| DE APPR. | RF | COPYRIGHT © 2000 BY DART AEROSPACE LTD | |
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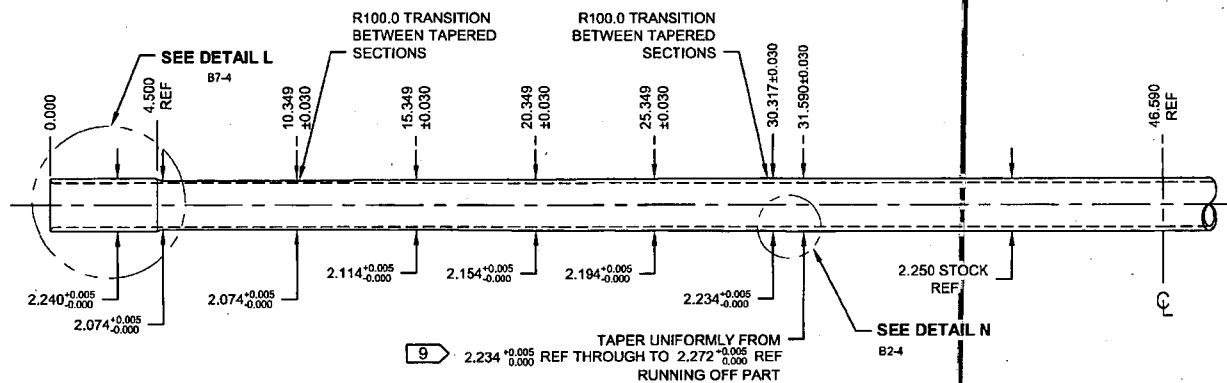
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4

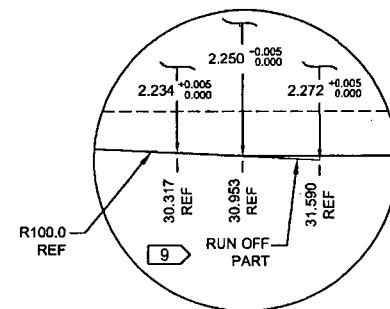
3

2

1

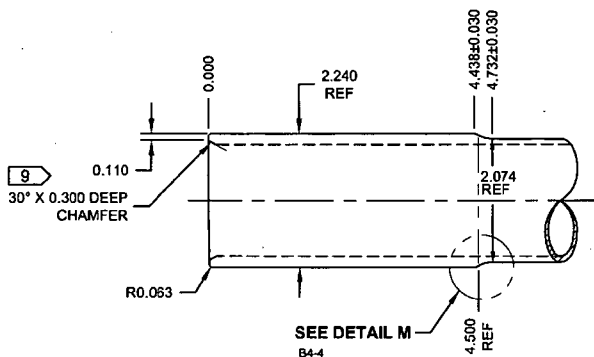


C TURNING DETAIL

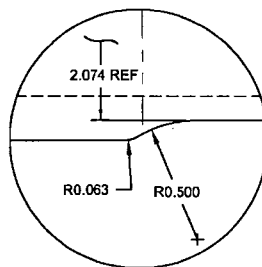


DETAIL N:
C4-4 TAPER RUN-OFF
NOT TO SCALE

RELEASED
08/11/06



DETAIL L:
D7-4 CROSSTUBE CUFF
NOT TO SCALE



DETAIL M:
A6-4 CUFF TRANSITION
NOT TO SCALE

| | | | |
|------------|-----------|---|--------------|
| DESIGN | W16 57009 | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | RF | DRAWING NO. | REV. C |
| CHECKED | RF | D206-667-141 | SHEET 4 OF 4 |
| MFG. APPR. | RF | TITLE | SCALE |
| APPROVED | RF | CROSSTUBE ASSY (206B HIGH FWD) | NTS |
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